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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re Application of: Liang Jiang et al. | § | |
| | § | Group Art Unit: 3746 |
| Serial No.: 10/682,227 | § | |
| | § | Examiner: Kim, Tai Jun |
| Filed: October 8, 2003 | § | |
| For: QUIET COMBUSTOR FOR A GAS TURBINE ENGINE | § | Atty. Docket: 126908-1/YOD GERD:0511 |

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37 C.F.R. 1.8

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June 25, 2007 — Lynda Howell
Date — Lynda Howell

## APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on February 20, 2007, and received by the Patent Office on February 23, 2007.

The Commissioner is authorized to charge the requisite fee of $500.00, and any additional fees, which may be necessary to advance prosecution of the present application, to Account No. 07-0868, Order No. 126908-1/YOD (GERD:0511).

Applicants hereby request a two (2) month extension in the statutory period for response to the Office Action from April 23, 2007 to June 23, 2007 in accordance with 37 C.F.R. § 1.136. The Commissioner is authorized to charge the requisite fee of $450.00, and any additional fees which may be required, to Deposit Account No. 07-0868; Order No. 126908-1/YOD (GERD:0511).

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02 FC:1252 450.00 DA

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## 1. REAL PARTY IN INTEREST

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company by Canan Uslu Hardwicke, Liang Jiang and Sung Jin Kim recorded at reel 014600, frame 0836, on October 8, 2003. Accordingly, General Electric Company, as the Assignee of the above-referenced application, will be directly affected by the Board's decision in the pending appeal.

## 2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

## 3. STATUS OF CLAIMS

Claims 1, 2, 6-12, 15, 18 and 19 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal. The claims appended to this Brief reflect the cancellations made on even date herewith (see Section 4 immediately below).

## 4. STATUS OF AMENDMENTS

Appellants have submitted an amendment on even date with this brief canceling claims 3-5, 13, 14, 16, 17, 20-21 and 23-24 to address objection under 35 U.S.C. § 112, and to place the application in better condition for appeal or allowance.

## 5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates generally to gas turbine engines. *See* Application, page 1, paragraph 1. More particularly, in certain embodiments, the invention relates to combustor assemblies for gas turbine engines.

The Application contains two independent claims, namely, claims 1 and 15. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a combustor (*e.g.*, 14) and a combustor cap liner assembly (*e.g.*, 42), comprising a combustor having a combustor casing (*e.g.*, 24) and a combustion liner (*e.g.*, 38) within the combustor casing wherein the combustion liner is closed at a forward end by the combustor liner cap assembly. *See, e.g., id.,* paragraphs 19, 21-22 and 23-24; *see also* FIGS. 3-5. The combustor also includes a cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover (*e.g.*, 30) to the combustor. *Id.,* paragraphs 18, 21, 27-39 and 40; *see also* FIGS. 3-5. The cellular solid media comprises a metal foam (*e.g.*, 16). *Id.,* paragraphs 18, 28 and 33-34; *see also* FIGS. 3-5.

With regard to the aspect of the invention set forth in independent claim 15, discussions of the recited features of claim 15 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a combustor (*e.g.*, 14) and a combustor cap liner assembly (*e.g.*, 42), comprising a combustor having a combustor casing (*e.g.*, 24) and a combustion liner (*e.g.*, 38) within the combustor casing wherein the combustion liner is closed at a forward end by the combustor liner cap assembly. *See, e.g., id.,* paragraphs 19, 21-22-24; *see also* FIGS. 3-5. The combustion liner cap assembly comprises a cellular solid media in a space defined by opposing surfaces (*e.g.*, 66, 68) of a circular plate (*e.g.*, 64), a burner tube (*e.g.*, 48), and an effusion plate (*e.g.*, 62) of the combustion liner cap assembly. *Id.,* paragraphs 18 and 25-40; *see also* FIGS. 3-5. The cellular solid media comprises a metal foam (*e.g.*, 16). *Id.,* paragraphs 18, 28 and 33-34; *see also* FIGS. 3-5.

A benefit of the invention, as recited in these claims, is reduction of noise emissions and acoustic dynamics during operation of a gas turbine. *See, e.g., id.,* paragraphs 3, 7, 17, 33-34, 38-39 and 41.

## 6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

**First Ground of Rejection for Review on Appeal:**

Appellants respectfully urge the Board to review and reverse the rejection of claims 1, 2, 6, 7, 12, 15, 18 and 19 under 35 U.S.C. § 102(b), as being anticipated by Prociw et al., (U.S. patent no. 6,495,207, hereinafter "Prociw").

**Second Ground of Rejection for Review on Appeal:**

Appellants respectfully urge the Board to review and reverse the rejection of claims 1, 2, 6, 12, 15, 18 and 19 under 35 U.S.C. § 102(e), as being anticipated by Griffin et al., (U.S. patent no. 6,834,504, hereinafter "Griffin").

**Third Ground of Rejection for Review on Appeal:**

Appellants respectfully urge the Board to review and reverse the rejection of claims 1, 2 and 6 under 35 U.S.C. § 103(a) as being unpatentable over JP 11-062549 (hereinafter "JP '549") in view of Grandey et al. (U.S. Patent No. 2,917,384; hereinafter "Grandey") and/or Brown et al. (U.S. published application no. 2003/00118762, hereinafter "Brown").

**Fourth Ground of Rejection for Review on Appeal:**

Appellants respectfully urge the Board to review and reverse the rejection of claims 1, 2, 6-12, 15, 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Griffin in view of Gutmark et al. (U.S. patent no. 6,464,489; hereinafter "Gutmark").

## 7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Sections 102 and 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants assert that claims 1, 2, 6-12, 15, 18 and 19 are currently in condition for allowance.

### A. Ground of Rejection No. 1:

The Examiner rejected claims 1-7, 12-19 under 35 U.S.C. § 102(b), as being anticipated by Prociw et al., (U.S. Patent 6,495,207, hereinafter "Prociw"). Claims 3-4, 13, 14, 16, 17 have been canceled by a Supplemental Response filed concurrent with this Appeal brief. Of these, only claims 1, 2, 6, 7, 12, 15, 18 and 19 remain pending. Of the remaining pending claims, rejected claims 1 and 15 are independent and will be discussed in detail below.

#### 1. Judicial precedent has clearly established a legal standard for a *prima facie* anticipation rejection.

Anticipation under Section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 227 U.S.P.Q. 773 (Fed. Cir. 1985). Thus, for a prior art reference to anticipate under Section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). Moreover, the prior art reference also must show the identical invention "in as complete detail as contained in the ... claim" to support a *prima facie* case of anticipation. *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989) (emphasis added). Accordingly, Appellants need only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter.

**2. The Examiner's rejection of independent claims 1 and 15 and claims depending therefrom is improper because the rejection fails to establish a *prima facie* case of anticipation.**

Independent claim 1 recites:

> a combustor having a combustor casing and a combustion liner within the combustor casing, wherein the combustion liner is closed at a forward end by the combustor liner cap assembly, the combustor including a cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover to the combustor and wherein the cellular solid media comprises a metal foam. (Emphasis added.)

Independent claim 15 recites:

> a combustor having a combustor casing and a combustion liner within the combustor casing, wherein the combustion liner is closed at a forward end by the combustor liner cap assembly, the combustion liner cap assembly comprising a cellular solid media in a space defined by opposing surfaces of a circular plate, a burner tube, and an effusion plate of the combustion liner cap assembly and wherein the cellular solid media comprises a metal foam. (Emphasis added.)

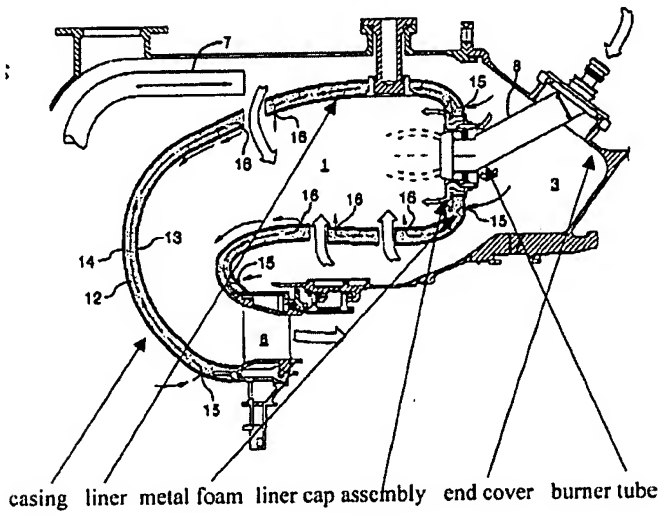
The rejection of claims 1, 15 and the recited claims dependent thereon based on Prociw is erroneous at least because Prociw fails to disclose (1) a combustion liner closed at a forward end by a combustor liner cap assembly; and (2) a cellular solid, metal foam media disposed in the locations recited in independent claims 1 and 15.

In the Final Office Action the Examiner cited FIG. 2 of Prociw and argued that Prociw teaches a combustor and a combustor cap liner assembly that includes a combustor casing (Prociw, FIG. 2, element 14) and a combustion liner (element 13) within the combustor casing. The Examiner further stated that the combustion liner is closed at a forward end by the combustor liner cap assembly. The Examiner went on to state that the combustor includes a cellular solid media (FIG. 2, element 12) disposed

within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover to the combustor. *See,* Final Office Action, page 4.

FIG. 2 of Prociw, as marked by the Examiner in the Final Office Action, Page 5, is reproduced below to facilitate the present discussion.

cap assembly.




The Examiner's analysis is incorrect. The Examiner apparently based the faulty analysis summarized in the Office Action on the abstract and a short passage of Prociw. Appellants respectfully point out that the parts of FIG. 2 of Prociw marked as above by the Examiner as "end cover" and "liner cap assembly" do not bear any corresponding element number in the reference. Moreover, these elements do not correspond to the claimed end cover and liner cap assembly. Nowhere does Prociw disclose *a combustor liner cap assembly, an end cover* and a cellular solid media *disposed within the combustor liner cap assembly* and/or *between the combustion liner cap assembly and an end cover* to the combustor. Moreover, the part marked as above by the Examiner as cellular solid media (element 12) is disposed only between the outer wall 14 and the inner wall 13 of the combustor casing and *not within the combustor liner cap assembly and/or*

*between the combustion liner cap assembly and an end cover to the combustor*, or in the locations recited in claim 15.

In a complete contrast, below are illustrations of the partial cross sectional view of a gas turbine combustor of FIG. 3, and a cross sectional view of a combustor liner cap assembly of FIG. 4 of the present application. As discussed in paragraph 21 of the application, the forward end of the combustor casing is closed by an end cover assembly 30 which may include conventional supply tubes, manifolds and associated valves, and the like, for feeding gas, liquid fuel, and air (and water if desired) to the combustor. The end cover assembly 30 receives a plurality of fuel nozzle assemblies 32 arranged in a circular array about a longitudinal axis of the combustor. Moreover, as set forth in paragraph 26 of the application, a cellular solid media is disposed within space 82 to reduce noise during operation of the turbine. The cellular solid media can occupy the complete space 82 or a portion thereof. In a preferred embodiment, the cellular solid media is circumferentially disposed about at least one burner tube 48. FIGS. 3 and 4 reproduced below are provided here with explanatory markings to facilitate an element-by-element comparison with the Prociw arrangement.

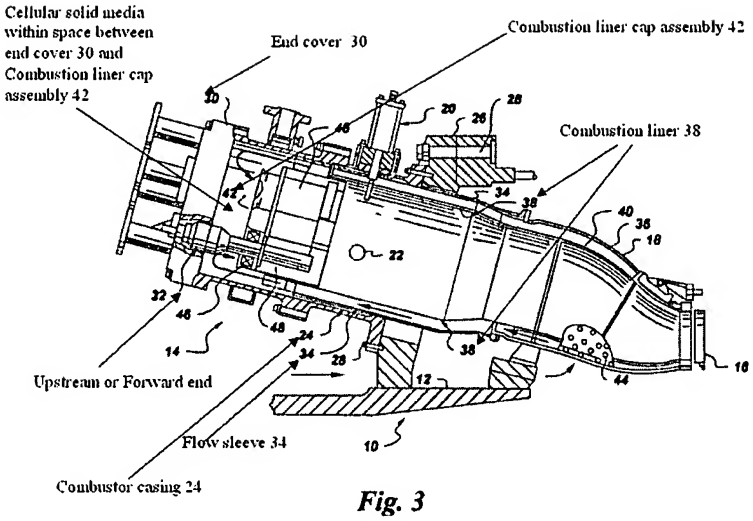

Cellular solid media within space between end cover 30 and Combustion liner cap assembly 42
End cover 30
Combustion liner cap assembly 42
Combustion liner 38
Upstream or Forward end
Flow sleeve 34
Combustor casing 24

*Fig. 3*

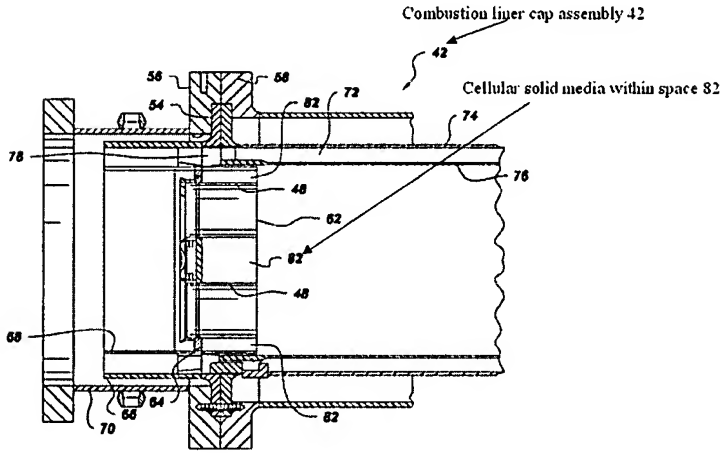

Combustion liner cap assembly 42
Cellular solid media within space 82

*Fig. 4*

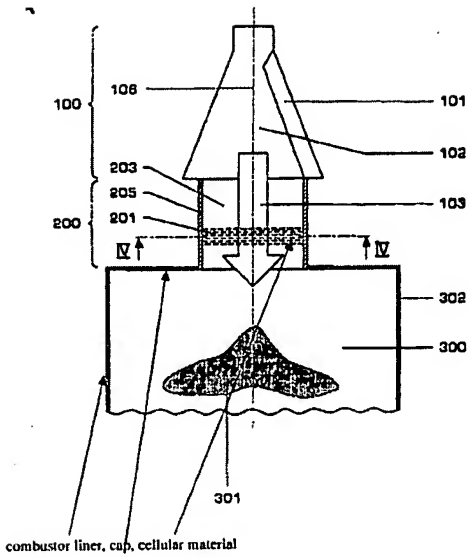
Appellants submit that Prociw does not teach a combustor having either the combustor liner cap assembly or an end cover. Further, Prociw does not teach a cellular solid media being disposed within the combustor liner cap assembly and/or between the combustor liner cap assembly and an end cover to the combustor, or in the locations recited in claim 15. Appellants respectfully submit that anticipation of independent claims 1 and 15, and claims depending therefrom cannot be supported based upon Prociw, and that these claims are allowable.

**B. Ground of Rejection No. 2:**

The Examiner rejected claims 1-6, 12-19 under 35 U.S.C. § 102(e), as being anticipated by Griffin et al., (U.S. Patent 6,834,504, hereinafter "Griffin"). Claims 3-4, 13, 14, 16, 17 have been canceled by a Supplemental Response filed concurrent with this Appeal brief. Of the remaining pending claims, rejected claims 1 and 15 are independent and will be discussed in detail below.

The rejection of claims 1, 15 and the claims dependent thereon based on Griffin is erroneous at least because Griffin fails to disclose (1) a combustor liner cap assembly, an end cover; and (2) cellular solid media disposed in the locations recited in each of independent claims 1 and 15.

In the Final Office Action the Examiner argued that Griffin teaches a combustor and a combustor liner cap assembly, and that the combustor includes a cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover to the combustor. *See,* Final Office Action, page 5. FIG. 1 of Griffin, as marked by the Examiner in the Final Office Action, page 5, is reproduced below to facilitate the present discussion.




The Examiner's analysis of Griffin is incorrect. Appellants respectfully point out that the parts of FIG. 1 of Griffin marked as above by the Examiner as "combustor liner", "cap" and "cellular material" do not correspond do those elements as understood from the present application. Griffin does not appear to disclose *a combustor liner cap assembly, an end cover* or a cellular solid media *disposed within the combustor liner cap assembly* and/or *between the combustion liner cap assembly and an end cover* to the combustor, or in the locations set forth in claim 15. Moreover, the part marked by the Examiner as "cellular solid media" is disposed perpendicular to the flow path of the combustion gas and is not *disposed within the combustor liner cap assembly* and/or *between the combustion liner cap assembly and an end cover* to the combustor.

There would appear to be some confusion on the part of the Examiner as to how the combustor for a gas turbine described in Griffin actually works. Griffin does disclose a net-like structure (201) arranged in a downstream part of the burner within the mixing section (200) where combustion air is mixed with the fuel. This net structure (201)

consists of at least one wire mesh (202) spanning over the flow cross-section (203). *See,* Griffin, col. 3, lines 59-63.

Griffin describes a premix burner where the net-like structure is a porous body of a foamed metallic material or foamed ceramic material. Griffin does not describe in any detail any end cover to the combustor, any combustor liner cap assembly, or any cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover to the combustor. Appellants submit that Griffin simply does not teach a combustor having either a combustor liner cap assembly or an end cover. Further, Griffin does not teach disposing the metal foam material in the locations recited in claims 1 and 15.

Appellants further point out that if the Examiner intended to rely on a theory of inherency with regards to the recited features of a combustor liner cap assembly, an end cover and a cellular solid media disposed as claimed, as seems to have been stated on the page 6, lines 1 and 5 of the Final Office Action, the extrinsic evidence must make clear that the missing subject matter is *necessarily present* in the Griffin arrangement, and that it would be so recognized by persons of ordinary skill. *In re Robertson,* 169 F.3d 743, 49 U.S.P.Q.2d 1949 (Fed. Cir. 1999). The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *Id.* If relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy,* 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). The Examiner, in presenting any inherency argument, bears the evidentiary burden and must adequately satisfy this burden. *See id.*

Appellants respectfully submit that, in view of these distinctions, Griffin cannot anticipate independent claims 1 and 15. Accordingly, Appellants respectfully submit that

all of the pending claims are allowable over Griffin, and respectfully request reversal of the rejection of these claims under Section 102(e) based on Griffin.

C. **Ground of Rejection No. 3:**

The Examiner rejected claims 1-4, 6-11, 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over JP 11-062549 in view of Grandey and/or Brown. Again, claims 3-4, 13 and 14 have been canceled by a Supplemental Response filed concurrently with this Appeal brief. Of the remaining pending claims, rejected claim 1 is independent and will be discussed in detail below.

1. **Legal Standard**

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes all of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

The rejection of claim 1 and the claims dependent thereon based on JP'549 in conjunction with the secondary references is erroneous at least because the references fail

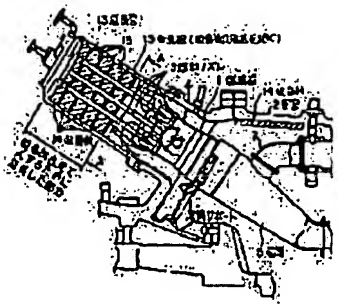
to disclose (1) a combustor liner cap assembly, an end cover; and (2) cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover to the combustor as recited in independent claim 1.

The Examiner argued that JP'549 teaches a combustor and a combustor cap liner assembly, wherein the combustor liner is closed at a forward end by the combustor liner cap assembly, and that the combustor includes a noise/vibration media with different porosities disposed within the combustor liner cap assembly. The Examiner's analysis is incorrect. The Examiner apparently based this overbroad statement on the abstract and images of JP'549. The "Problem to be solved" and the "Solution" passages of JP'549 are reproduced below to facilitate the analysis advanced below. Appellants respectfully point out that nowhere in JP'549 is there any disclosure of *a combustor liner cap assembly, an end cover*, or a cellular solid media *disposed within the combustor liner cap assembly* and/or *between the combustion liner cap assembly and an end cover* to the combustor. Moreover, the Examiner did not clearly point out any such elements said to be disclosed by the reference.

(54) COMBUSTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To effectively absorb combustion vibration energy with sound absorbing material so as to prevent vibration accompanying combustion from generating by surrounding the upper stream side of fuel nozzles with a pipe, and filling the space between the pipe and the fuel nozzles with sound absorbing material. SOLUTION: An extended pipe 13 is extended on the upper stream side of fuel nozzles 3 so as to surround the circumference of them. A sound absorbing material holder with perforated plates 15 is provided between the extended pipe 13 and the fuel nozzles 3, and the interior of the sound absorbing material holder is filled with sound absorbing material 14. The perforated plates 15 are provided for preventing the sound absorbing material 14 from splashing, the sound absorbing material holder is divided into several layers for freely setting deviation of the sound absorbing material 14 and the thickness of the sound absorbing material 14 so as to enable damping effect to be adjusted. Because a space to be filled with the sound absorbing material 14 is provided on the upper stream parts of the fuel nozzles 3, the flow of air for combustion is not obstructed. The sound absorbing material 14 with the perforated plate 15 is also fitted o the inside of a cabin 2. Hereby, combustion vibration energy is effectively absorbed by the sound absorbin material to prevent vibration accompanying combustion from generating.



This deficiency of JP'549 is not overcome by either Grandey or Brown. The Examiner relied on Grandey solely for the teaching of the use of metal foams for high temperature applications including in gas turbine engines. Likewise, the Examiner relied upon Brown solely for the teaching of a noise/vibration media used in turbine applications using a cellular structure. JP'549 teaches a combustor having fuel nozzle that is characterized by the provision of a surrounding pipe on the upper side of the fuel nozzle along with the acoustic material filled in between the pipe and the fuel nozzle. Further, Grandey teaches metallic foam materials and a method of producing them and, more particularly, a metallic foam material for elevated temperature applications. Moreover, Brown teaches a turbine with an integral noise absorber. The turbine housing has an integral exhaust outlet conduit that forms part of the noise absorber. Even given these teachings, the placement of such materials in the arrangement of JP'549 could not

read on the recitations of claim 1. Therefore, Appellants submit that the elements of *a combustor liner cap assembly, an end cover* and a cellular solid media *disposed within the combustor liner cap assembly* and/or *between the combustion liner cap assembly and an end cover* to the combustor are not taught by any combination of the JP'549, the Grandey or the Brown references.

Clearly, the secondary references do not teach placement of a metal foam in the locations claimed. Moreover, the parts of the JP '549 combustor referred to by the Examiner are not analogous to the components of claim 1 within or between which the metal foam is placed.

Moreover, Appellants submit that it would not have been obvious for one skilled in the art to replace the acoustic material of JP'549 with the metallic foam material of Grandey or the noise absorber of Brown. The motivation to combine these references is not found in any of the references.

In the "Response to Arguments" section of the Final Office Action, page 10, the Examiner stated that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. The Examiner went on to state that the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. The Examiner further mentioned that it would have been obvious to use the materials of Brown for the acoustic material of JP'549.

Appellants respectfully point out that the Examiner has not shown the requisite motivation or suggestion to combine the cited references to reach the present claims. As summarized above, the Examiner must provide objective evidence, rather than subjective belief or conjecture, of the requisite motivation or suggestion to combine the cited

references. *In re Lee*, 61 U.S.P.Q.2d. 1430 (Fed. Cir. 2002). For example, in the present rejection, the Examiner combined the cited references based on the *conclusory and subjective statement* that it would have been obvious "to one of ordinary skill in the art to employ the noise/ vibration reduction media taught by Grandey and/or Brown in order to enhance the noise reduction desired by JP'549 and/or to use the material well known in the gas turbine noise attenuation as being suitable for high temperature applications and for the same purpose. It would have been obvious to one of ordinary skill in the art to employ the claimed ranges as being a material property of the claimed materials or as an obvious matter of finding the workable ranges in the art." Final Office Action, page 9.

Appellants respectfully emphasize that the intention of JP'549 is to effectively absorb combustion vibrational energy with sound absorbing material by surrounding the upper stream side of fuel nozzles with a pipe, and filling the space between the pipe and the fuel nozzles with sound absorbing material. JP'549, Abstract, lines 1-5. There is no evidence that this goal would or could be accomplished with the media taught by Grandey and/or Brown.

Furthermore, JP'549 and Grandey and Brown, even in combination, teach noise attenuation in the *premixer hot section* and do not teach disposing a cellular media such as metal foam for achieving noise attenuation for *cap and inlet flow areas* where the temperatures are less than the premixer hot section. Accordingly, Appellants respectfully request the Board to reverse this rejection under 35 U.S.C. § 103.

**D. Ground of Rejection No. 4:**

The Examiner rejected claims 1-19 under 35 U.S.C. § 103(a) as being unpatentable over Griffin in view of Gutmark. Here again, claims 3-4, 13, 14, 16, 17 have been canceled by a Supplemental Response filed concurrently with this Appeal

brief. Of the remaining pending claims, rejected claims 1 and 15 are independent and will be discussed in detail below.

As has been pointed out in the previous sections of this Brief (Second Ground of Rejection), the rejection of independent claims 1 and 15 based on Griffin is erroneous at least because Griffin fails to disclose (1) a combustor liner cap assembly and an end cover; and (2) cellular solid media disposed in the locations claimed.

The Examiner argued that Griffin teaches various aspects of the claimed invention and would *inherently use a combustor casing and an end cover*. Further, the Examiner argued that Gutmark teaches an entire combustor assembly from the same manufacturer where the combustor casing and end cover are explicitly shown. The Examiner concluded that it would have been obvious to one of ordinary skill in the art to employ a combustor casing and an end cover, as being the conventional practice in the art.

The Examiner's analysis is incorrect. FIG. 6 of Gutmark is reproduced below to facilitate the discussion of this rejection. Appellants respectfully point out that Gutmark, like Griffin, fails to teach *a combustor liner cap assembly, an end cover* and a cellular solid media *disposed in the locations claimed.*

Elements 101 and 102 of Griffin (see above) would appear to correspond to element 14 of Gutmark. It is wholly unclear, however, where the "cellular material" of Griffin would be placed in Gutmark. The location shown in Griffin is simply absent in Gutmark. In other words, the references appear to be inconsistent. At the very least, Appellants submit that to assume that two devices from one manufacturer are the same, or even consistent in design, as the Examiner has done, is to enter the realm of mere conjecture, unfounded and unsupported by these references.

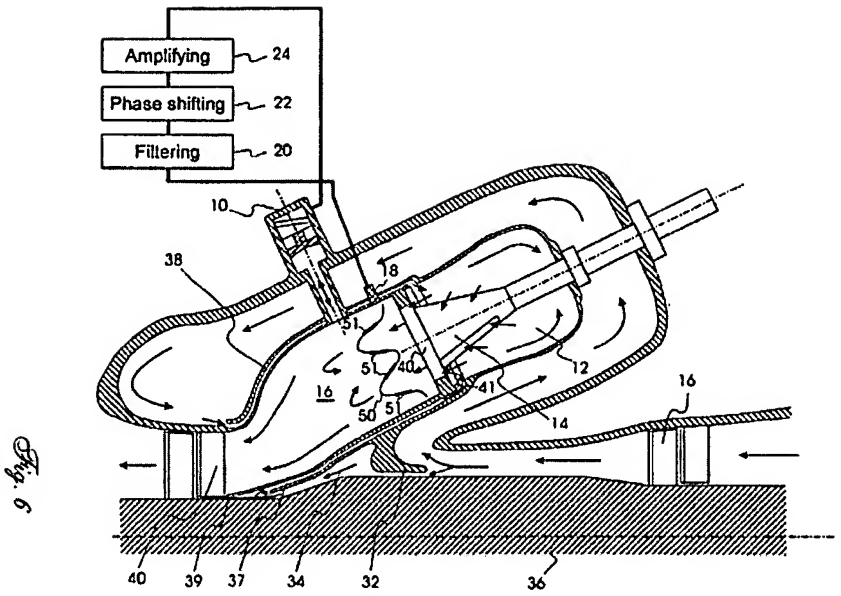



Fig. 6

Thus, the deficiency of Griffin is not overcome by Gutmark. The Examiner relied on Gutmark solely for the teaching of combustor casing and an end cover and not a cellular solid media *disposed within the combustor liner cap assembly* or *between the combustion liner cap assembly and an end cover* to the combustor. As noted above, the end cover and liner are absent from Griffin, however. To the extent that the structures of Griffin and Gutmark appear to be inconsistent, Appellants submit that the references cannot possibly teach the claimed placement of a metal foam.

As for the inherency argument, as observed above (regarding Griffin), Griffin teaches a net-like structure arranged in a downstream part of the burner within the mixing section of the combustion air with the fuel. In the present instance, in the absence of adequate basis in fact and/or technical reasoning to reasonably support the supposed similarity or combinability of the Griffin and Gutmark structures, the allegedly inherent

features of a combustor liner cap assembly, an end cover and a cellular solid media disposed as claimed do not necessarily flow from the teachings of either reference.

Further, Gutmark teaches a method and apparatus for controlling thermoacoustic vibrations in a combustion system having a combustion chamber and a burner, by forming a fluid shear layer in the region of the burner that is acoustically excited. Appellants submit that it would not have been obvious for one skilled in the art to combine the net-like structure of Griffin with the apparatus of Gutmark. The motivation to combine these references is simply inconsistent with the references. This is particularly true insomuch as the arrangements do not appear to be consistent with one another, as discussed above.

Rather, if combinable at all, Griffin and Gutmark, even in combination, would teach acoustically exciting a shear layer that forms in the working gas as the working gas flows through the hot burner section. They do not teach a cellular media for achieving noise attenuation for a cap and inlet flow area where the temperatures are less than the premixer hot section.

**Conclusion**

In view of the foregoing discussion, Appellants respectfully request that the Board reverse the rejections and indicate the allowability of the pending claims.

Respectfully submitted,

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## 8. APPENDIX OF CLAIMS ON APPEAL

**Listing of Claims:**

1. A combustor and a combustor cap liner assembly, comprising:

a combustor having a combustor casing and a combustion liner within the combustor casing, wherein the combustion liner is closed at a forward end by the combustor liner cap assembly, the combustor including a cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and an end cover to the combustor and wherein the cellular solid media comprises a metal foam.

2. The combustor and a combustor cap liner assembly of Claim 1, wherein comprising the cellular solid media in the combustion liner cap assembly is disposed about at least one burner tube extending through the combustion liner cap assembly.

6. The combustor and a combustor cap liner assembly of Claim 1, wherein the cellular solid media comprises a metal alloy and/or superalloy material.

7. The combustor and a combustor cap liner assembly of Claim 6, wherein the metal alloy and or super alloy comprises a metal selected from the group consisting of chrome, aluminum, cobalt, nickel, iron, tungsten, molybdenum, and titanium.

8. The combustor and a combustor cap liner assembly of Claim 1, wherein the cellular solid media has a density less than or equal to about 50 percent relative to a bulk density of the media.

9. The combustor and a combustor cap liner assembly of Claim 1, wherein the cellular solid media has a density of about 3 percent to about 10 percent relative to the density of a bulk nonporous solid with the same chemical composition as that of the cellular solid media.

10. The combustor and a combustor cap liner assembly of Claim 1, wherein the cellular solid media has a pore density greater than about 5 pores per inch.

11. The combustor and a combustor cap liner assembly of Claim 1, wherein the cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and the end cover comprises multiple discs of the media having different porosities.

12. The combustor and a combustor cap liner assembly of Claim 1, wherein the cellular solid media disposed within the combustor liner cap assembly and/or between the combustion liner cap assembly and the end cover comprises a single disc.

15. A combustor and a combustor cap liner assembly comprising:

a combustor having a combustor casing and a combustion liner within the combustor casing, wherein the combustion liner is closed at a forward end by the combustor liner cap assembly, the combustion liner cap assembly comprising a cellular solid media in a space defined by opposing surfaces of a circular plate, a burner tube, and an effusion plate of the combustion liner cap assembly and wherein the cellular solid media comprises a metal foam.

18. The combustor and a combustor cap liner assembly of Claim 15, wherein the cellular solid media comprises a metal alloy and/or superalloy material.

19. The combustor and a combustor cap liner assembly of Claim 18, wherein the metal alloy and or super alloy comprises a metal selected from the group consisting of chrome, aluminum, cobalt, nickel, iron, tungsten, molybdenum, and titanium.

## 9. EVIDENCE APPENDIX

None.

## 10. RELATED PROCEEDINGS APPENDIX

None.